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ABSTRACT

Most vision screening today concerns itself only with the physical phase of vision, consequently the relationship of vision to learning becomes slighted. Rather, vision should be discussed as it operates when learning takes place through seeing. Vision as it operates for learning is a very complex process--it has physical (acuity), physiological (integrative), and psychological (perceptual) phases. In order to help individual children who are experiencing learning difficulty and who may have vision deficiencies, the teacher should (1) understand the process of visual learning (which is affected by maturation, development, and many other factors); (2) know the limitations of the vision screening program used; and (3) know the child's visual abilities. Knowledge of symptoms, information gleaned from various tests, use of a full screening program, and referral for a complete vision evaluation--all these can help the teacher to know a child's visual abilities. In addition, early detection and early removal of visual deficiencies is important. The child must not only see clearly, but he must also be able to use the visual signals and have ample experiences in developing visual skills related to important perceptual abilities. References are included. (AW)

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Vision Screening and Learning

The topic given me to discuss is "Vision Screening and Learning". We hope our discussion of this topic will result in more realistic screening for vision difficulty than is generally in use today. As we work to achieve the goals of the right to read effort and other programs concerned with children's learning in terms of their true potential, it is important to examine the tools we are using to determine how effective they are in enabling us to accomplish our goals.

Most vision screening today of school children is very limited and what is done has very little relation to a child's ability to learn by means of seeing. (9, 8, 2) When we discuss vision screening and learning, we should discuss vision as it operates when learning takes place through seeing. This is

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crucial to a proper understanding of the factors involved*.

Vision (13) as it operates for learning is a very complex process, having a physical, (acuity) a physiological (integrative) and a psychological (perceptual) phase. Most vision screening today concerns itself mainly with the first phase only, the physical, and ignores completely important factors in the psychological and psychological phases of vision. It could be said that the emphasis is on screening for health factors rather than screening for factors related to learning by means of seeing. Research has shown that if just acuity (3) is considered, the relationship of vision to reading is slight. If the physiological (integrative) and psychological (perceptual) phases are included, the relationship is a much stronger one (4). This difference in the amount of the process of vision considered is crucial to an understanding of vision and its relationship to learning. To be sure we are making our point clearly, we offer the following tabulation in the three general phases of vision: (The tabulation is not meant to be complete, but is offered in general terms.)

Physical: Acuity, refractive error (Hyperopia, myopia, astigmatism)

Physiological: Response of the eyes to light, phories, ductions (convergence and divergence skills) focus facility,

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*In this we are not considering vision as the ability to just "see" but to factors involved to make the operating difference between the person who says, "May I read it myself so that I may see it to understand it." and the person who says "Please read it to me so that I may hear it to understand it". Both could have sight of equal acuity but learning obviously is easier through vision in one case and through hearing in the other case.

accommotive-convergence relationships, eye movement skills, amblyopia, strabismus, general health (past and present)

Psychological: Ability to perceive likenesses and differences in form, position in space, size and space relationships, visual-memory, memory for visual sequence, figure ground, visual-motor, and visual encoding and decoding, to name some of the more common categories.

It can be seen that if acuity testing only is used for screening, a large portion of vision as it operates for learning is ignored. As Helen Robinson (12) has said, reading teachers are concerned with:

> "1. The visual difficulties most likely to inhibit reading progress;
> 2. means of identifying pupils with visual problems; and
> 3. visual manifestations which require referral for refraction even though they are not related to reading achievement.".

You will find that most vision screening programs today, if the school has one, is concerned with "visual manifestations which require referral for refraction even though they are not related to reading achievement".

The relationship of acuity (5) to reading readiness and reading achievement at the first grade level is one of our longitudinal studies was either a low minus or a low plus relationship which researchers interpret as "no relationship". This is supported by other studies in the research literature.

What then can you, who are interested in the ability of your students to learn by means of seeing, do to help individual

children who are experiencing learning difficulty and who may have vision deficiencies impeding their success?

First of all, understand that when a child learns by means of seeing, a complex process is involved which is affected by maturation and most importantly development and also factors within the child as well as without. Health, fatigue and emotion effect the physiological and psychological phases (1). Development in particular, affects the psychological and physiological phases (14).

Next, understand what the vision screening program in your school tells you about a child's ability to learn by means of seeing and what it does not tell you. In other words, know the limitations of your particular vision screening program.

Thirdly, study carefully the means at your disposal to have as much knowledge as possible of the functioning of the total process of vision of a particular child: physical (acuity); physiological (integrative); and psychological (perceptual).

There are various means at your disposal to add to your knowledge of the vision abilities of a given child: (A) knowledge of, and observation of symptoms; (B) information gleaned from tests you are already giving within your school system; (C) tests you could easily add to those you are now giving; (D) a full screening program (E) referral for a complete vision evaluation.

Because of lack of time to cover each area adequately, we will mention only resources available to implement those means just mentioned to add to your knowledge of the vision abilities of a given child.

A. Symptoms: one of the most affective screening programs available to you is your ability to observe the child's behavior (11) in the classroom tasks and what this behavior lets you know about the child. To familiarize yourself with symptoms of possible vision difficulty a child can display in the classroom, two check lists are available for your use:

1. Teachers Guide to Visual Problems available from the American Optometric Association, 7000 Chippewa Street, St. Louis, Missouri, 63119. Symptoms are grouped under: A's--appearance of the eye; B's--behavior indications of possible vision difficulty; C's--complaints associated with using the eyes.

2. Educators Guide to Classroom Vision Problems available from the Optometric Extention Program Foundation, Duncan, Oklahoma 73533. Symptoms are grouped under those related to: eye movement skills, eye teaming skills, eye-hand coordination skills, visual form perception, refractive status.

In addition, there is a manual and slides entitled Children's Vision and School Success,(15) written by Dr. George Spache and myself. The manual and slides are presently being revised and will be available through one of your regular school sources. It will contain a discussion of vision for learning; vision demands of the classroom with slides to illustrate; limitations of present screening programs; symptoms of possible vision difficulty children display in the classroom with slides to illustrate children showing the symptoms; what the teacher can do in light of these symptoms to help a particular child; helpful programs to add to the school curriculum.

B. & C. Means at your disposal: are considered together since what is available to a given teacher varies with the teacher and the system in which she teaches. Performance or:

1. Diagnostic Reading Tests: noting omissions, reversals, substitutions, re-reading, losing place, lip movement, signs of stress, lack of memory, fatigue with testing--the many signs listed in the symptoms lists already mentioned.

2. Readiness Tests: numbers copying and percentile rank on the Metropolitan Reading Test have been found to be significantly related to vision (10, 6).

3. Visual-Motor Tests: Poor performance on--Gesell Forms, Bender Gestalt, Benton, Rutgers Drawing Test, indicate possible learning difficulty.

4. I.Q. Tests: Data found in Binet and Wechsler Tests. Ruth Strang in Diagnostic Teaching of Reading gives an analysis of Wechsler sub test which indicate that all of the performance tests involve visual perception.

If performance scores are lower than verbal scores, poor visual perception could be affecting these scores. The teacher is interested in the spread of scores and will want to search for strengths and weaknesses. Is the child good in some areas but weak in areas involving visual perception?

5. Frostig's Development Test of Visual Perception: eye motor coordination, figure-ground, form constancy, position in space, spatial relations are the areas of perceptual development included in her test and developmental program.

6. The Illinois Test of Psycholinguistic Abilities has nine representational levels of difficulty: visual decoding, visual-

motor association, visual-motor sequencing are concerned with vision. These are important considerations. A useful screening for these same areas has been found in: Reading Time Manual, CleoLiving Aids, 3957 Mayfield Road, Cleveland, Ohio 44121.

7. Specific sections of the Detroit Tests of Learning Aptitude relating to vision are: pictorial absurdities, pictorial opposites, motor speed, visual attention span for objects, designs, visual attention span for letters.

D. A full screening program: Under this heading I will refer you to the program developed by the University of Pittsburgh Learning Research and Development Center. It could be used as a guide to you in developing such a screening program for your own schools. You will want to secure working papers #47 and #53 by writing to: Learning Research and Development Center, University of Pittsburgh, 1602 North Craig Street, Pittsburgh, Pennsylvania, 15213. The Perceptual Skills Testing and Curriculum Manual #53 covers the following areas: general motor, visual-motor, auditory motor, integrative. The Rosner-Richman Perceptual-Motor Survey #47, provides a fuller screening for vision especially in addition to the areas covered in working paper #53. We want to stress that superficial screening or testing is not the answer for children in difficulty.

E. Referral for a complete vision evaluation and treatment. This will require you to be sufficiently acquainted with the vision practitioners in your area so that you will know the ones whose examination and treatment includes all three phases of vision: physical, physiological and psychological. Not all practitioners

cover all three areas (15). All cover the physical, a goodly number include some testing in the physiological phase. A much smaller group do in-depth testing in the physiological area and also in the psychological area and in addition provide for deficiencies in these areas in their treatment programs.

You are each naturally thinking in terms of your own problems. Where do I begin? How do I develop a screening program that enables me to help the children I teach or whose teaching is under my supervision?

I was asked to suggest an ideal screening program. This is not easy. It is like chosing between Scylla and Cherybdie.

First of all, work at understanding what is involved in all three phases of vision as it operates when learning by seeing. Analyze the means available to you in your teaching system to know whether a particular child could be having difficulty learning by seeing. Probably all of you have available through one course or another knowledge of the physical area provided by screening with the Snellen Chart. However, this area alone omits other areas showing much stronger relationships to learning.* The Massachusetts, Atlantic City, School Vision Testor and similar screening programs test only grossly in the physiological area in addition to the physical. The telebinocular, full Orthereter and full Titmus** will

*It is important to note here that the pre-school amblyopic testing is in the same category since it is concerned with distance acuity. It is therefore screening for health and not for learning readiness.

**In this discussion it is important to note that these three instruments are for all practical purposes the same. They were designed by the same person who started out at Keystone, went to Bausch and Lamb (ortho-rater) and finally on to Titmus. The appearance of the instrument and the materials used may look different, but the same vision factors can be screened by all three.

provide additional information in the physiological area. However, important accommodative, (focusing) convergence, (turning eye inward to fixate an object) relationships, focus facility, and eye movement skills are not included even in this extended type of screening. In addition to important areas in the physiological phase, the psychological area is not included except in a very slight degree. It is well to remember that these are all screening programs and as such do not provide full information but rather rough indications of difficulty.

Better devices are becoming available to detect factors in the perceptual area; visual-motor tests, and more of the perceptual abilities needed for achievement. We have listed some of them.

Because of the variation in professional services available as previously mentioned--some practitioners (7) limit their testing and care programs to mainly the physical phase and omit the psychological phase entirely, therefore, just a general referral for an eye examination is not going to remove vision deficiencies for all children.

Clinical experience has shown repeatedly the importance of testing children early in their formal school experience to know whether or not they are ready for specific classroom activities. Early detection and early removal of deficiencies is important. Too much failure, for too long, usually results in removing a child from his true potential for life.

Many school children have been doomed to such a fate because their true problem was not detected. It is a common fallacy to think that if a child sees clearly, he has the vision he needs for

school achievement. It is also a common fallacy to think that deficiencies in the physiological and the psychological phases are due to maturation alone and that time will remove them. We know that for some children this does not happen. I hope that what we have said here today has helped you see how very much more is involved when we consider vision for learning. Not only must a child see clearly, but he must also be able to use the visual signals reaching the cortex and he must have had ample experience in developing many visual skills in addition to important perceptual abilities.

By making your vision screening realistic; screening for vision factors related to learning; by seeing that the children with deficiencies receive the help they need; by adjusting the educational programming for these children to teach to their strengths while alleviating their weaknesses; you will experience the joy that comes from helping more children learn in terms of their true potential.

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